CLAIMS

1. A planar solid oxide fuel cell in which a fuel electrode layer and an oxidant electrode layer are arranged on both surfaces of a solid electrolyte layer, respectively; a fuel electrode current collector and an oxidant electrode current collector are arranged outside said fuel electrode layer and said oxidant electrode layer, respectively; respective separators are arranged outside said fuel electrode current collector and said oxidant electrode current collector; and a fuel gas and an oxidant gas are supplied from said respective separators to said fuel electrode layer and said oxidant electrode layer, respectively, through said fuel electrode current collector and said oxidant electrode current collector, respectively, wherein:

each of said separators comprises a first gas discharge opening for discharging the introduced gas from the central part of said separator and a plurality of second gas discharge openings for discharging the introduced gas along the peripheral part of said separator in a circular manner.

2. The planar solid oxide fuel cell according to claim 1, wherein said each separator is made up by laminating a plurality of thin metal plates at least including a thin metal plate provided with said first gas discharge opening and said second gas discharge openings and a thin metal plate having a worked indented surface.

3. The planar solid oxide fuel cell according to claim 2, wherein the thin metal plate provided with said first gas discharge opening and said second gas discharge openings is arranged at least on the side of each of said fuel electrode current collectors.

4. A separator for use in a solid oxide fuel cell which is contacted with each current collector arranged outside each electrode to form a gas passage for supplying a gas to the electrode, wherein:

the separator comprises a first gas discharge opening for discharging an introduced gas from the central part thereof and a plurality of second gas discharge openings for discharging the gas along the peripheral part thereof in a circular manner.

5. The separator for use in a solid oxide fuel cell according to claim 4, wherein the separator is made up by laminating a plurality of thin metal plates at least comprising a thin metal plate provided with said first gas discharge opening and said second gas discharge openings and a thin metal plate having a worked indented surface.

6. The separator for use in a solid oxide fuel cell according to claim 5, wherein the thin metal plate provided with said first gas discharge opening and said second gas discharge openings is arranged at least on the side of the fuel electrode current collector.

7. A solid oxide fuel cell in which a fuel electrode layer and an oxidant electrode layer are arranged on both surfaces of a solid electrolyte layer, respectively; a fuel electrode current collector and an oxidant electrode current collector, both collectors being formed of a porous substance, are arranged outside said fuel electrode layer and said oxidant electrode layer, respectively; respective separators are arranged outside said fuel electrode current collector and said oxidant electrode current collector; and a fuel gas and an oxidant gas are supplied from said respective separators to said fuel electrode layer and said oxidant electrode layer, respectively, through said fuel electrode current collector and said oxidant electrode current collector, respectively; wherein:

indents are formed on the surface of each of said separators, which surface is in contact with each of said current collectors, to increase the dwell volume of the gas in said current collectors.

8. A solid oxide fuel cell in which a fuel electrode layer and an oxidant electrode layer are arranged on both surfaces of a solid electrolyte layer, respectively; a fuel electrode current collector and an oxidant electrode current collector, both collectors being formed of a porous substance, are arranged outside said fuel electrode layer and said oxidant electrode layer, respectively; respective separators are arranged outside said fuel electrode current collector and said oxidant electrode current collector; and a fuel gas and

an oxidant gas are supplied from said respective separators to said fuel electrode layer and said oxidant electrode layer, respectively, through said fuel electrode current collector and said oxidant electrode current collector, respectively;

wherein:

the peripheral part of the surface of each of said separators, which surface is in contact with each of said current collectors, is protruded expandably to increase the linear velocities of the gases in the peripheral parts of said current collectors.

9. A solid oxide fuel cell in which a fuel electrode layer and an oxidant electrode layer are arranged on both surfaces of a solid electrolyte layer, respectively; a fuel electrode current collector and an oxidant electrode current collector, both collectors being formed of a porous substance, are arranged outside said fuel electrode layer and said oxidant electrode layer, respectively; respective separators are arranged outside said fuel electrode current collector and said oxidant electrode current collector; and a fuel gas and an oxidant gas are supplied from said respective separators to said fuel electrode layer and said oxidant electrode layer, respectively, through said fuel electrode current collector and said oxidant electrode current collector, respectively;

wherein:

indents are provided on the surface of each of said separators, which surface is in contact with each of said

current collectors, and the peripheral part of each of said separators is protruded expandably.

10. The solid oxide fuel cell according to any one of claims 7 to 9, wherein the surface shape of said separators is formed at least on the surface in contact with said current collectors.

11. The solid oxide fuel cell according to any one of claims 7 to 10, wherein the fuel cell comprises a structure in which said fuel gas and said oxidant gas are supplied from the central parts of said separators, respectively, to said fuel electrode layer and said oxidant electrode layer, respectively, through said fuel electrode current collector and said oxidant electrode current collector, respectively.

12. A separator for use in a solid oxide fuel cell which is in contact with one of the current collectors arranged outside the respective electrodes to form a gas passage for supplying a gas to one of the electrode sections, wherein:

indents are provided on the surface of said separator, which surface is in contact with one of said current collectors, to increase the dwell volume of the gas in said current collectors.

13. A separator for use in a solid oxide fuel cell which is contacted with each current collector arranged outside each electrode to form a gas passage for supplying a gas to each electrode section, wherein:

the peripheral part of the surface of the separator, which surface is in contact with said current collector, is protruded expandably to increase the linear velocity of the gas in the peripheral part of said current collector.

14. A separator for use in a solid oxide fuel cell which is contacted with each current collector arranged outside each electrode to form a gas passage for supplying a gas to each electrode section, wherein:

indents are provided on the surface of the separator, which surface is in contact with said current collectors, and the peripheral part of the surface concerned is protruded expandably.

15. The separator for use in a solid oxide fuel cell according to any one of claims 12 to 14, wherein said surface shape of the separator is formed at least on the surface in contact with one of the fuel electrode current collectors.